



**Pharmacognostic Characterization of Rarely Used Herbs Described in Nighantus
with Comparative Microscopy of *Haritaki* (*Terminalia chebula*) from Distinct
Geographical Origins -A Comprehensive Review**

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Abstract

Background:

Nighantus represent the advanced evolution of Ayurvedic Materia Medica, expanding beyond *Bruhatrayi* with elaborate descriptions of *dravya rasa-guna-veerya-vipaka-prabhava* and morphological identifiers. Several drugs recorded in *Dhanvantari*, *Raja*, *Kaiyadeva*, *Madanpala*, and *Bhavaprakasha Nighantu* remain underutilized today despite historically documented therapeutic potency (1)(2). Scientific pharmacognostic profiling enables revitalization of such rare herbs through botanical authentication, quality assurance, and standardization.

Aim & Objectives:

1. To critically compile and analyse pharmacognostic traits of lesser-used Nighantu herbs.
2. To perform a comparative pharmacognostic evaluation of *Haritaki* fruits collected from the Western Ghats, Himalayas, & Eastern India.
3. To correlate classical morphological descriptors with modern anatomical microscopy and powder analysis.

Materials & Methods:

An Ayurvedic review was conducted using *Nighantu* databases, *Bruhatrayi*, *Nighantu* commentaries, and modern pharmacognostic indexes. Microscopy of authenticated *Haritaki* samples included TS, maceration, powder microscopy under normal & polarized light, and histochemical staining using safranin–fast green dual mode (3)(4). Comparisons were made based on stone cell clusters, vessel structure, epidermal cuticle, tannin localization, and rosette crystals (5)(6).

Key Review Findings:

Parpat, *Ajagandha*, *Surasa*, *Shyonaka*, and *Svadupami/Swaduparni* demonstrate specific micro-characters such as prismatic crystals, glandular trichomes, unicellular hairs, parenchymal mucilage and porous pith that enable unambiguous authentication.

Haritaki samples varied significantly: Western Ghats fruits contained abundant stone cells and tannin masses; Himalayan fruits showed thin pericarp and sparse trichomes; Eastern region fruits had dense sclereids and high rosette crystal population (7)(8)(9).

These differences validate the Ayurvedic doctrine *Desha-Bheda* (regional variations) and influence potency, stability, and formulation value.

Conclusion:

Pharmacognostic standardization bridges ancient textual ethnobotany with modern scientific validation. Rare *Nighantu* herbs warrant reintegration into clinical practice after histological authentication. *Haritaki* demonstrates strong geoclimatic phytovariation, necessitating source-specific monograph development for future pharmacopeial inclusion.

Keywords: *Nighantu dravyas*, Pharmacognosy, *Haritaki* microscopy, rare herbs, tannin content, *Terminalia chebula*, stone cells, histochemical analysis

Introduction

. Significance of *Nighantu* Literature

Nighantus expanded Ayurvedic pharmaceutical knowledge post-*Samhita* era by systematically arranging synonyms, botanical traits, morphological keys, *rasa-guna-veerya-vipaka*, *prabhava*, therapeutic uses & household knowledge of herbs. The transition from *Charaka–Sushruta* to *Nighantu* tradition reflects a shift from medical textual theory to practical botanical ethnography (10)(11).

Yet many herbs detailed in these texts are currently underused due to:

Lack of field identification knowledge, no standard pharmacognostic monographs, missing commercial cultivation & procurement systems, poor documentation of micro-diagnostic criteria. Reviving such herbs expands Ayurvedic drug diversity & research.

2. Importance of *Haritaki* Standardisation

Haritaki (*Terminalia chebula* Retz.) is exalted as *Abhaya*- remover of disease fear, placed at the apex of *Rasayana dravyas* (12). It is one of *Triphala*, indicated in *Jirna Jwara*, *Pandu*, *Grahani*, *Kasa*, *Vibandha* and post-*shodhana* recovery (13).

However, adulteration with *T. belerica* / *T. catappa* is common, and regional climatic influence alters tannin profiles. Pharmacognostic differentiation thus becomes mandatory.

MATERIALS & METHODS

Study Design

- Qualitative *Nighantu* review and laboratory pharmacognostic comparison.
- Three regional samples of *Haritaki* collected & authenticated by standard taxonomy keys

Ayurvedic Source Material Reviewed

- *Dhanvantari Nighantu (Pūrvārdha–Uttarārdha)*
- *Raja Nighantu – Shatpushpadi, Guduchyadi Varga*
- *Kaiyadeva Nighantu – Oshadhi Varga*

- *Bhavaprakasha Nighantu – Haritakyadi Varga*
- *Madanpala Nighantu, Charaka Samhita, Sushruta Samhita*

Modern Sources

PubMed, Scopus, ScienceDirect, AYU, AJP, Pharmacognosy Journal, ICP Monographs

Search Terms

Nighantu herbs, pharmacognostic features, Haritaki microscopy, stone cells, tannins, Terminalia chebula histology.

Inclusion Criteria

1. Mentioned in ≥ 2 Nighantu
2. Rarely used clinically
3. Uncommon in supply chains
4. Complete micro-character data possible

REVIEW & OBSERVATIONS

A. Rare *Nighantu* Herbs - Classical vs Pharmacognostic Traits

Herb	Classical Description	Pharmacognostic Identifiers	Nighantu Evidence
<i>Parpat (Oldenlandia corymbosa)</i>	<i>Sheeta, Krimihara</i>	Branched stem, opposite leaves, unicellular trichomes	(14)
<i>Ajagandha (Cleome viscosa)</i>	<i>Tikshna, Go-gandhi</i>	Pungent odour, stalked glandular hairs, yellow seeds	(15)
<i>Surasa (Ocimum sanctum / tenuiflorum)</i>	<i>Kapha-Vatahara</i>	Peltate glandular trichomes, aromatic oil droplets	(16)
<i>Shyonaka (Oroxylum)</i>	<i>Shothahara, Shoolaprasamana</i>	Porous pith, prismatic calcium	(17)

indicum)		oxalate crystals	
<i>Swaduparni</i> (<i>Glycyrrhiza glabra</i> identified group)	<i>Sheeta, Madhura, Rasayana</i>	Thick cortex, mucilage cells, starch grains	(18)

B. Detailed Pharmacognostic Comparison of *Haritaki*

1. Macroscopic Variation

Region	External Morphology
Western Ghats	Larger fruits, deep brown, thick epicarp
Himalayas	Small to medium fruit, light brown, thin pericarp
Eastern India	Irregular wrinkles, dark blackish, prominent ridges

2. Microscopy

Parameter	Western Ghats	Himalayas	Eastern India
Stone Cells	Dense clusters (~30–45%)	Sparse (~15–22%)	Very dense (~40–55%)
Tannin Content	High (+++)	Low (+)	Moderate to High (++)
Rosette Crystals	Moderate	Few	Numerous
Trichomes	Simple unicellular abundant	Very few	Moderate density
Vessels	Wide lumen	Narrow lumen	Thickened border pits

Stone cell percentage & tannin concentration correlate with ecological humidity, elevation & temperature gradient.

DISCUSSION

Rare herbs of *Nighantus* represent unutilised pharmaco-therapeutic wealth. Pharmacognostic

documentation creates a bridge for:

- Preservation of traditional knowledge
- Prevention of adulteration
- Raw drug standardisation
- Research revival & cultivation interest

Comparative microscopy proves *Haritaki* varies *desha-bheda* wise, affirming Ayurvedic doctrine "*Desha-Kaala-Bhava-Prabhava*" (19).

Future directions include:

- HPTLC fingerprinting
- DNA barcoding
- Tannin quantification correlation with *Rasayana* activity
- Regional monograph development

CONCLUSION

Pharmacognostic authentication is the foundation for revival of underused *Nighantu* herbs.

Comparative microscopy confirms structural variations in *Haritaki* across geographical locations, influencing potency and suitability in formulations.

Further integration of Ayurvedic textual classification and modern microscopic & molecular techniques can restore these forgotten *dravyas* to therapeutic mainstream.

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